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RECIP.NAME RECIPIENT AFFILIATION
TEDESCO,R.L. Assistant Director for Licensing

SUBJECT: Forwards responses to containment sys independent design review open items transmitted in 810604 ltr to HR Denton.

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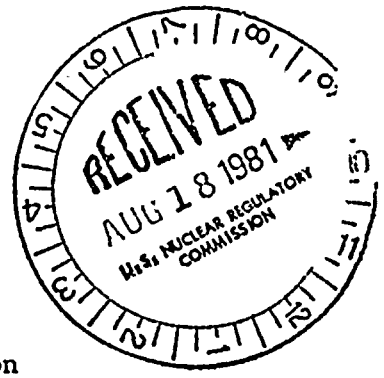
August 17, 1981
ANPP-18668 - JMA/KWG



Mr. R. L. Tedesco
Assistant Director for Licensing
Division of Licensing
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Palo Verde Nuclear Generating Station
(PVNGS) Units 1, 2 and 3
Docket Nos. STN-50-528/529/530
File: 81-056-026

Reference: ANPP-18147 to H. R. Denton dated June 4, 1981

Dear Mr. Tedesco:

Please find attached a copy of our responses to the Containment Systems Independent Design Review open items transmitted in the referenced letter. These responses are provided in support of your effort to write our SER.

If you have any questions, please contact me or my staff.

Very truly yours,

E. E. Van Brunt

E. E. Van Brunt, Jr.
APS Vice President,
Nuclear Projects
ANPP Project Director

EEVBJr/KWG/av
Attachment
cc: J. Kerrigan
P. Hourihan
A. C. Gehr

B001
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1/1

STATE OF ARIZONA)
) ss.
COUNTY OF MARICOPA)

I, Edwin E. Van Brunt, Jr. represent that I am Vice President Nuclear Projects of Arizona Public Service Company, that the foregoing document has been signed by me on behalf of Arizona Public Service Company with full authority so to do, that I have read such document and know its contents, and that to the best of my knowledge and belief, the statements made therein are true.

Edwin E. Van Brunt

Edwin E. Van Brunt, Jr.

Sworn to before me this 17th day of AUGUST, 1981.

Connie Lou Armstrong

My Commission expires:

June 24, 1983

"The response to NRC question 6.2.5-10 was in error and should be corrected for the record. A fan for cooling the recombiner is mounted on the skid; however, the cooling air is taken from and returned to the outside environment, rather than taken from inside the auxiliary building as reported during the design review. The inlet and outlet structures are protected against tornados and missiles by orientation and structural shielding. The penetrations are above the maximum flood level. The permanent portions of the recombiner cooling air ducts and louvers are designed to Seismic Category 1 and Quality Group B."

RESOLUTIONS OF OPEN ITEMS ADDRESSED AT CONTAINMENT SYSTEMS IDR

ACTION #1

Change Figure 2-1 to include the shutdown heat exchanger bypass line (p. 34).

RESPONSE

Figure 2-1 has been revised to show the bypass line and a copy provided for inclusion in the final transcript.

ACTION #2

Alter wording of Exhibit 2-5 to clarify power sources for spray pumps (p. 39).

RESPONSE

Exhibit 2-5 is correct as presented. The CSS pumps, valves and instrumentation are capable of being powered from: 1) two independent offsite power sources; 2) the emergency generators and, 3) the plant turbine generator via the startup transformer using buses in the switchyard.

ACTION #3

Investigate the potential for high activity leakage being present in the piping downstream of the leakage relief valves which discharge into the auxiliary building (p. 49).

RESPONSE

The leakage of valves and pumps was presented in Exhibit 2-30. These leakages are normally handled as radioactive waste and are routed to the liquid radwaste system via a common discharge header. An isolation valve in the common discharge header can be remotely operated from the control room. This valve can be shut to prevent post-LOCA fluids from entering the liquid radwaste system after an accident. Over the long term, the sump pumps could be manually operated and could be sampled with the post accident sampling system to determine if liquid in the sumps could be pumped to the liquid radwaste system.

ACTION #4

Investigate loading restrictions on the ground over the pipe tunnel to the refueling water tank (p. 54).

RESPONSE

The loading on the ground over the pipe tunnel to the refueling water tank shall be restricted to H15 loading. The H15 loading consists of a maximum concentrated load of 24,000 lbs. applied at any point along the pipe run.

ACTION #5

Add a section marking to Figure 2-8 as applicable (p. 66).

RESPONSE

Figure 2-8 has been amended to show the section line and a copy provided for inclusion in the final transcript.

ACTION #6

Indicate on Figure 2-5 the extent of the modeling done during the containment sump flow tests (p. 70).

RESPONSE

Figure 2-5 has been amended to show the extent of modeling during sump flow testing and a copy provided for inclusion in the final transcript.

ACTION #7

Add the height of the screen to Figure 2-6 (p. 73).

RESPONSE

Figure 2-6 has been amended to show the height of the sump screen and a copy provided for inclusion in the final transcript.

ACTION #8

Provide justification for the jog capability for valves SI-UV-655 and -656 shown on P&ID 13-M-SIP-002. Is this valid for PVNGS? (p. 78)

RESPONSE

Throttling capability for selected valves in the shutdown cooling system (SCS) suction lines had been added as a solution to the long-term cooling (LTC) boron precipitation concern. This solution called for a limited amount of reactor coolant system (RCS) fluid to be admitted to the LPSI pump suction and mixed with sump water in order to quench steam voids. Thus a flushing path through the core would be established via an RCS hot leg suction capability. At the time when this capability was specified, the LTC solution was not certain and, since it was understood that throttling capability could be provided, it was made a requirement. Subsequently, simultaneous RCS hot-leg and cold-leg injection by the HPSI system became the preferred LTC solution. Thus, at present, throttling of the SCS suction valves is not anticipated, and retention of that capability is desirable only from a flexibility standpoint.

Since any throttling capability, should it ever be required, can be provided by SI-653 & -654, there is no need for SI-655 & -656 to also provide that capability. There is no harm, though, in their having throttling capability.

ACTION #9

Document guidelines that have been provided to APS Operations for the containment spray system operation as per Exhibit 2-40, paragraph 2 (p. 79).

RESPONSE

The system operation during various modes of operation is described in the PVNGS System Descriptions Manual, Vol. I, Sec. 2.3.3, Containment Spray System Operation. This manual is in the possession of PVNGS Operations.

ACTION #10

Provide the accuracy specification of the containment water level monitors (p. 93).

RESPONSE

The accuracy of the containment water level monitors is not known since the instruments have not been purchased. However, the procurement specification calls for an accuracy of $\pm$ 0.5%. APS will be informed if monitors are purchased with a different accuracy.

ACTION #11

Provide drawings of auxiliary spray patterns to be appended to transcript (p. 98).

RESPONSE

The spray patterns of the nozzles are shown on the attached new figures, Figures 2-11 thru 2-14, and copies provided for inclusion in the final transcript.

ACTION #12

Provide the maximum allowable overlap of the sprays and the fractional coverage (p. 98).

RESPONSE

The C-E spray nozzle arrangement results in approximately 21% overlap at the operating floor level for a single train. The fractional coverage at the operating floor level is 91.1% (Train A) and 91.8% (Train B).

ACTION #13

Clarify valve arrangements of Figure 3-3 (p. 112).

RESPONSE

The typical valve arrangements shown in Figure 3-3 are correct. The arrangement with flow into the containment via the containment spray system has no in-line valves shown. The arrangement for high or low pressure safety injection has two additional in-line check valves downstream of the check valve shown. Figure 3-3 has been amended to show these valves with the note "Safety Injection only". An additional note has been added to signify containment spray nozzles or reactor coolant system. In addition, Figure 3-1 has been revised to show a valve downstream of the drain and test connection. Updated versions of Figure 3-1 and 3-3 have been provided for inclusion in the final transcript.

ACTION #14

Provide an indication on Figure 3-7 of the type of seal on the outer hatch of the personnel lock (p. 13).

RESPONSE

The personnel lock outer hatch is a double "O" ring seal. Figure 3-7 has been revised and a copy provided for inclusion in the final transcript.

ACTION #15

Look into possibility of atmospheric leakage through Type C penetrations, particularly via the spray headers (p. 120).

RESPONSE

For a LOCA these valves are required to open and leakage is not pertinent. If the system is subsequently shut off, containment pressure will have dropped and water in the lines will provide a water seal to prevent leakage of containment air to the environs. FSAR Section 6.2.6.3 details the rationale for not using Type C testing.

ACTION #16

Remove the shutdown cooling system from the "non-essential" list on Exhibit 3-57 (p. 138).

RESPONSE

The shutdown cooling system has been removed from the "non-essential" list on Exhibit 3-57 and transferred to the "essential" list on Exhibit 3-55, and copies provided for inclusion in the final transcript.

ACTION #17

Reword Exhibits 3-9 and 3-59 to show automatic transfer to emergency power (p. 139).

RESPONSE

Exhibits 3-9 and 3-59 have been reworded to indicate automatic transfer to emergency power and copies provided for inclusion in the final transcript.

ACTION #18

Clarify application of Regulatory Guide 1.11 to containment pressure monitor penetrations.

RESPONSE

Discussions with the NRC subsequent to the Containment Systems IDR indicate that while they do not agree with the application of R.G. 1.11 to the referenced penetrations, the design is adequate based on GDC 56. An explanation of the GDC 56 compliance will be provided in FSAR Section 6.2.4.

ACTION #19

Examine the need to add relief systems to closed-cold penetrations (p. 142).

RESPONSE

The theoretical expansion of water in a perfectly rigid, closed, vaporless container can result in high pressure, although the amount of expansion or volume leakage required to reduce the pressure is quite small (4%). The containment penetrations are not assumed to be perfectly rigid, nor are the valves assumed to be leak-tight at excessive pressures. In addition, the trapped fluid will not attain the maximum pressure associated with the containment atmosphere temperature due to heat loss from the pipe to the environment. The flued head penetration design at PVNGS has only the flued head exposed to the elevated temperatures. We do not believe relief systems need to be added to closed-cold penetrations.

ACTION #20

Identify the Type C tested 1 inch steam penetrations in Table 6.2.4-1 of FSAR (p. 143).

RESPONSE

Valves SGE-V603 and SGE-V611 are incorrectly identified as being Type C leakage tested. These valves are used to vent the steam generator to the containment purge system and to blanket the steam generator with nitrogen. The valves are Type A tested. FSAR Table 6.2.4-1 will be amended to reflect Type A testing and will be incorporated in FSAR Amendment 5.

ACTION #21

Clarify the use of traps on the main steam lines as per GDC 56 & 57 (p. 145).

RESPONSE

As discussed in FSAR Section 6.2.6.3, "Isolation valves connected to the secondary side of the steam generator, such as main steam isolation valves, main steam relief valves, feed water valves, blowdown lines, and blowdown sample lines are not considered containment isolation valves and are not subjected to Type C tests. If there is leakage from primary to secondary side, the steam generator may be flooded in the event of a LOCA to effectively seal any tube leaks. If required, the filling of the steam generators will be performed by the auxiliary feedwater system, which meets the single failure criteria."

ACTION #22

FSAR Section 6.2.4.3 states that an operating procedure will require that manual valves such as those shown in Valve Arrangements #3, #5, #12, #28 and #35 be verified as closed prior to any operation requiring containment integrity. It is our position that in order for a manual valve to serve as an isolation barrier, the valve should be under the administrative control required for "sealed closed barriers" as defined in SRP Section 6.2.4.II.3.F. This guidance applies also to manual valves in test, vent, and drain lines, although welded caps or blind flanges may be used in place of sealed closed isolation valves.

Provide assurance that the above guidance will be followed for all manual valves employed as containment isolation barriers. (Note: This does not apply to remote manual valves in lines which must be opened for safe shutdown of the plant.) (p. 150).

RESPONSE

All manual valves employed as containment isolation barriers will be under the administrative control required for sealed closed barriers as defined in SRP Section 6.2.4.II.3.F.

ACTION #23

Provide assurance that valve CH-V393 in the regenerative heat exchanger vent line (Reference FSAR Figure 9.3-13, Sheet 1 of 5) will be locked closed during normal operation (p. 152).

RESPONSE

FSAR Figure 9.3-13 and Drawing 13-M-CHP-001 will be amended to show that valve CH-V393 will be locked closed during normal operation.

ACTION #24

Explain why the following valves will not be automatically closed by a containment isolation signal: HP-HV-7A and HP-HV-8A (p. 152).

RESPONSE

Valves HP-HV-7A and HP-HV-8A are the inlet valves to the hydrogen analyzers and are used only for post-LOCA hydrogen analysis that may be at elevated pressures, e.g., above the containment isolation signal setpoint. The valves are normally closed and fail closed. The hydrogen monitoring system is a closed system outside the containment and the piping and monitors are Seismic Category I and Safety Class 2. Therefore, a containment isolation actuation signal to close the valves is not required.

ACTION #25

Confirm that the usage of motor-operated valves for containment purge valves is acceptable (p. 155).

RESPONSE

These valves are eight inch, motor-driven butterfly valves and are normally closed in the "safe" position. One valve at each penetration is powered from a Safety Train "A" Class 1E motor control center, and the other valve is powered from a Safety Train "B" Class 1E motor control center. The diversity of power sources provides redundancy against a single failure. The motors are sized to close the valves against 60 psig containment atmosphere.

ACTION #26

Resolve the possibility of a test connection being left open on double O-ring type seals, thereby defeating one of two barriers (p. 156).

RESPONSE

The test connections on double O-ring type seals are closed by pipe plugs. The procedure for leak rate tests will reflect the need to replace plugs at the completion of the test. The outside containment end of these types of penetrations are either flanged or have another double O-ring seal to provide an additional barrier.

ACTION #27

Revise the FSAR Hydrogen Generation figures to reflect the updated results presented in the IDR (p. 162).

RESPONSE

FSAR Figure 6.2.5-2 will be amended and incorporated in FSAR Amendment 5.

ACTION #28

Determine the time delay due to the surge volume of the containment prior to 50 cfm purging being driven by injected service air (p. 164).

RESPONSE

No time delay will exist since the driving head for the purge unit will be established by manually aligning the system with the recombiner blower in order to take suction from the containment and to discharge to the purge unit.

ACTION #29

Provide a copy of, or the location of, "Thermal Hydrogen Recombiner System for Water-Cooled Reactors", Rockwell Int'l Report No. AI-75-2, Rev. 3(P), Canoga Park, CA., July 1977, as referenced in FSAR Section 6.2.5.6 or demonstrate NRC acceptance of a similar system on an existing plant (p. 168).

RESPONSE

The Report AI-75-2, Rev. 3, was submitted to the NRC under Atomics International letters 77AT-8210, September 16, 1977 and 77AT-10229, November 23, 1977. One PVNGS recombiner is currently on site at the Duke Power Oconee Station; another is being prepared for shipment to the Rancho Seco Power Station. Additionally, the following operating plants have similar recombiners: Zion, Beaver Valley, Three Mile Island, Milestone, and North Anna. The PVNGS recombiners will be returned to the site by October, 1981.

ACTION #30

Revise Exhibit 4-3 to clarify the capacities of recombiners (p. 171).

RESPONSE

Exhibit 4-3 has been revised to show the individual capacities of recombiners and a copy provided for inclusion in the final transcript.

ACTION #31

Remove references to the double failure of recombiners throughout as a basis for the need of a purge system (p.181).

RESPONSE

Exhibits 4-4, 4-21 and 4-30 have been revised to remove reference to double failure of recombiners and copies provided for inclusion in the final transcript.

ACTION #32

Examine and resolve the possibility of hydrogen accumulations of higher concentration in closed regions of the containment, particularly in the reactor drain tank room and elevator shaft (p.182).

RESPONSE

The response will be provided by August 24, 1981.

ACTION #33

Provide results of the shielding review as per NUREG-0737, Item II.B.2 (p. 186).

RESPONSE

The response was provided in LLIR Amendment 1.

ACTION #34

Revise the FSAR to indicate the corrected accuracy of the hydrogen monitor (p. 188).

RESPONSE

FSAR Table 6.2.5-1 will be amended and incorporated in FSAR Amendment 5.

ACTION #35

Demonstrate the adequacy of the containment design and arrangement to assure convective mixing of hydrogen thoughout, and adequate cooling (p. 194).

RESPONSE

Figures 1 through 4 show the general arrangement of the containment internal structure. Large portions of the floor slabs are grating rather than concrete. This open design promotes natural convection within the containment. To provide additional mixing capability, auxiliary spray headers have been provided beneath the 120' and 140' concrete slabs.

Adequate cooling is assured through a combination of containment sprays and passive heat sinks. Safety-related equipment is qualified for the post-LOCA containment environment.

ACTION #36

Provide data demonstrating adequate HVAC capacity in the auxiliary building with the recombiners in operation (p. 195).

RESPONSE

As noted in the cover letter, the response given in the meeting was in error. The HVAC for the recombiners takes suction from and discharges back to the outside atmosphere. Therefore, this question is not applicable.

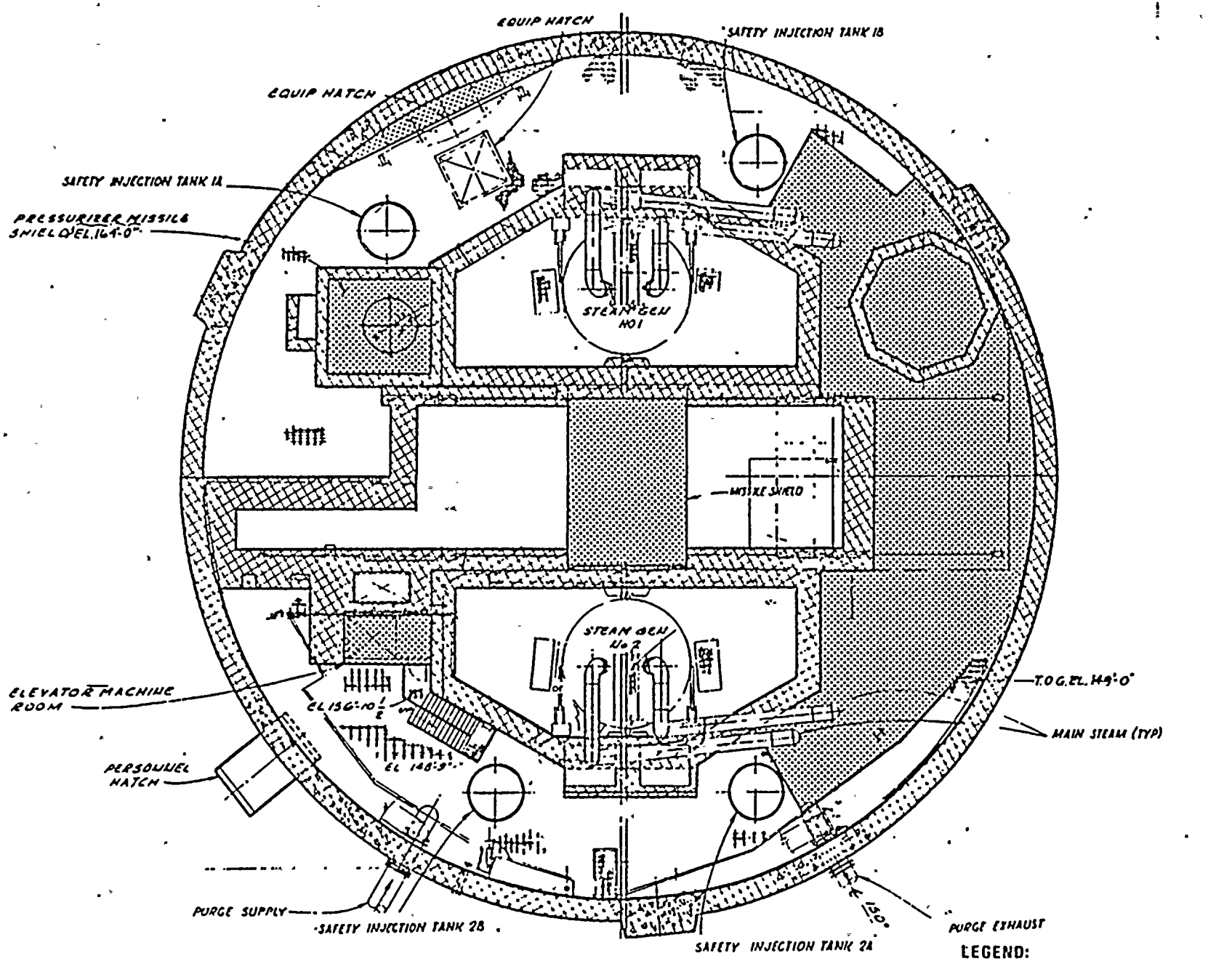
ACTION #37

Verify that the hydrogen monitors will conform to NUREG-0737, Appendix B (p. 196).

RESPONSE

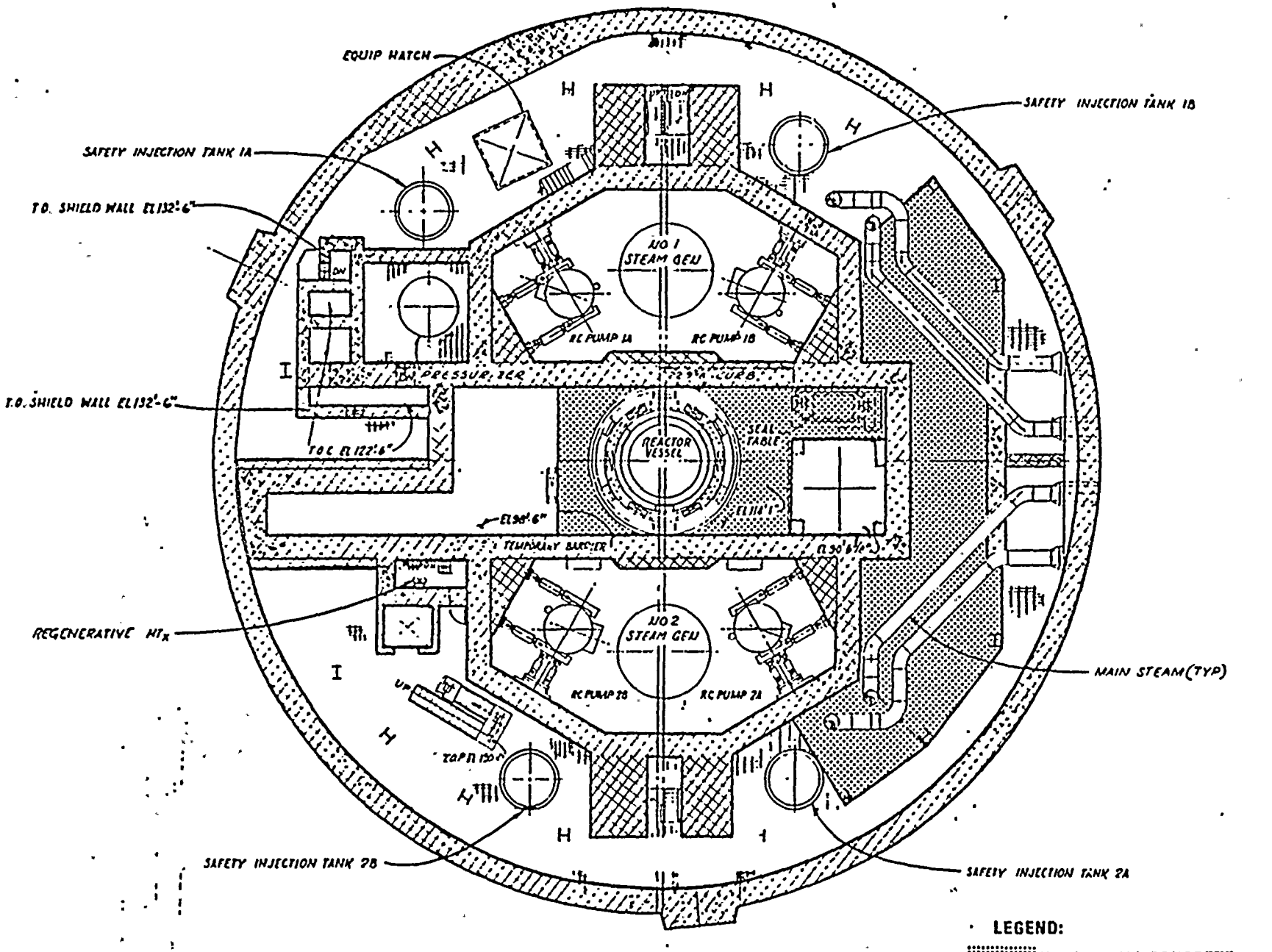
The hydrogen monitors will conform to NUREG-0737, Appendix B, in that:

- Instruments are environmentally qualified in accordance with Regulatory Guide 1.89.
- Instrumentation is available to the operator in the event of a single failure.
- Instrumentation is energized from Class IE power.
- Recording capability will be available on Channel A.
- Monitoring instrumentation data are obtained from direct measurements.
- Periodic testing of instrumentation is in accordance with Regulatory Guide 1.118.



PLAN AT EL 140'-0"

Figure 1



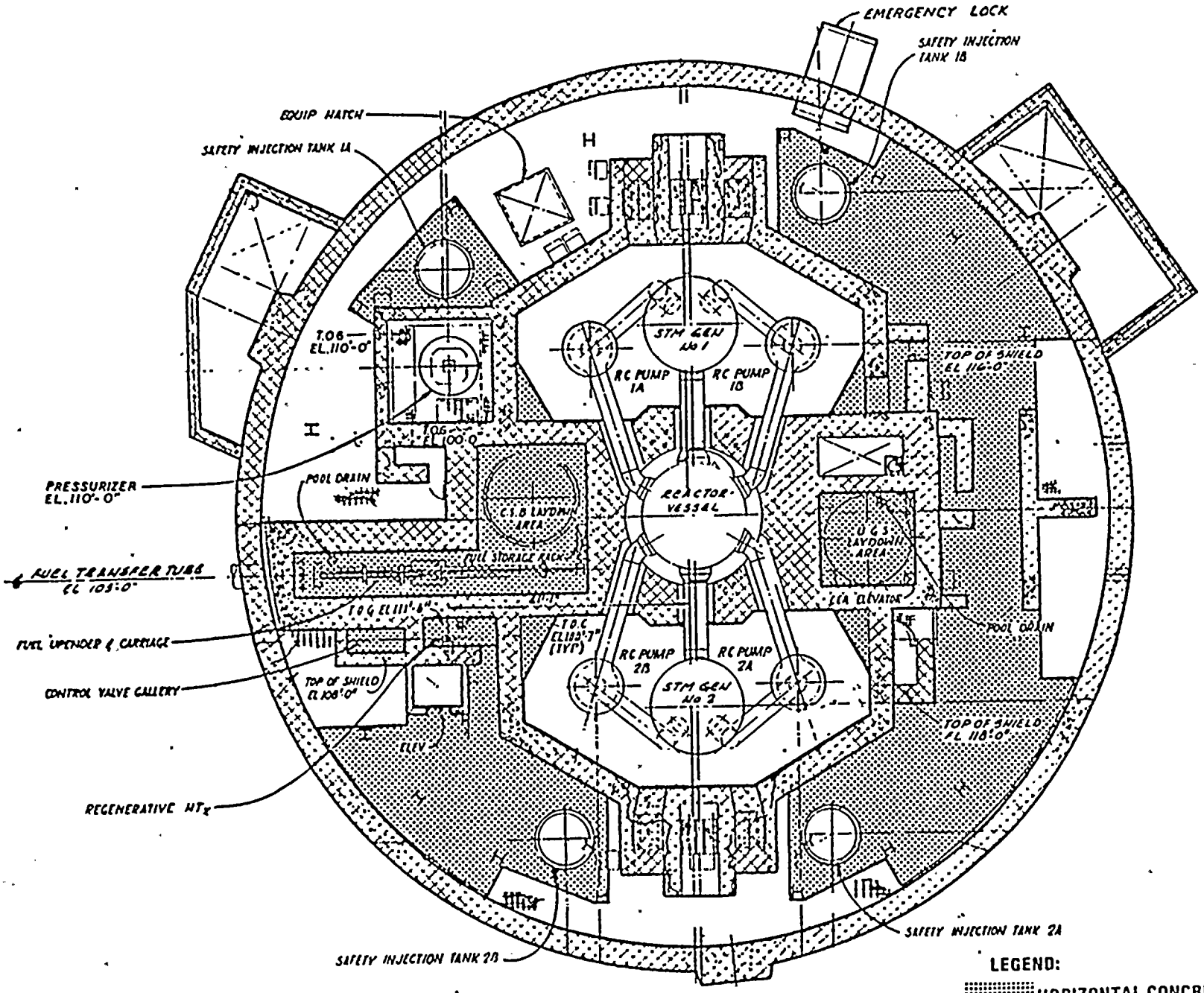
PLAN AT EL 120'-0"

LEGEND:

HORIZONTAL CONCRETE

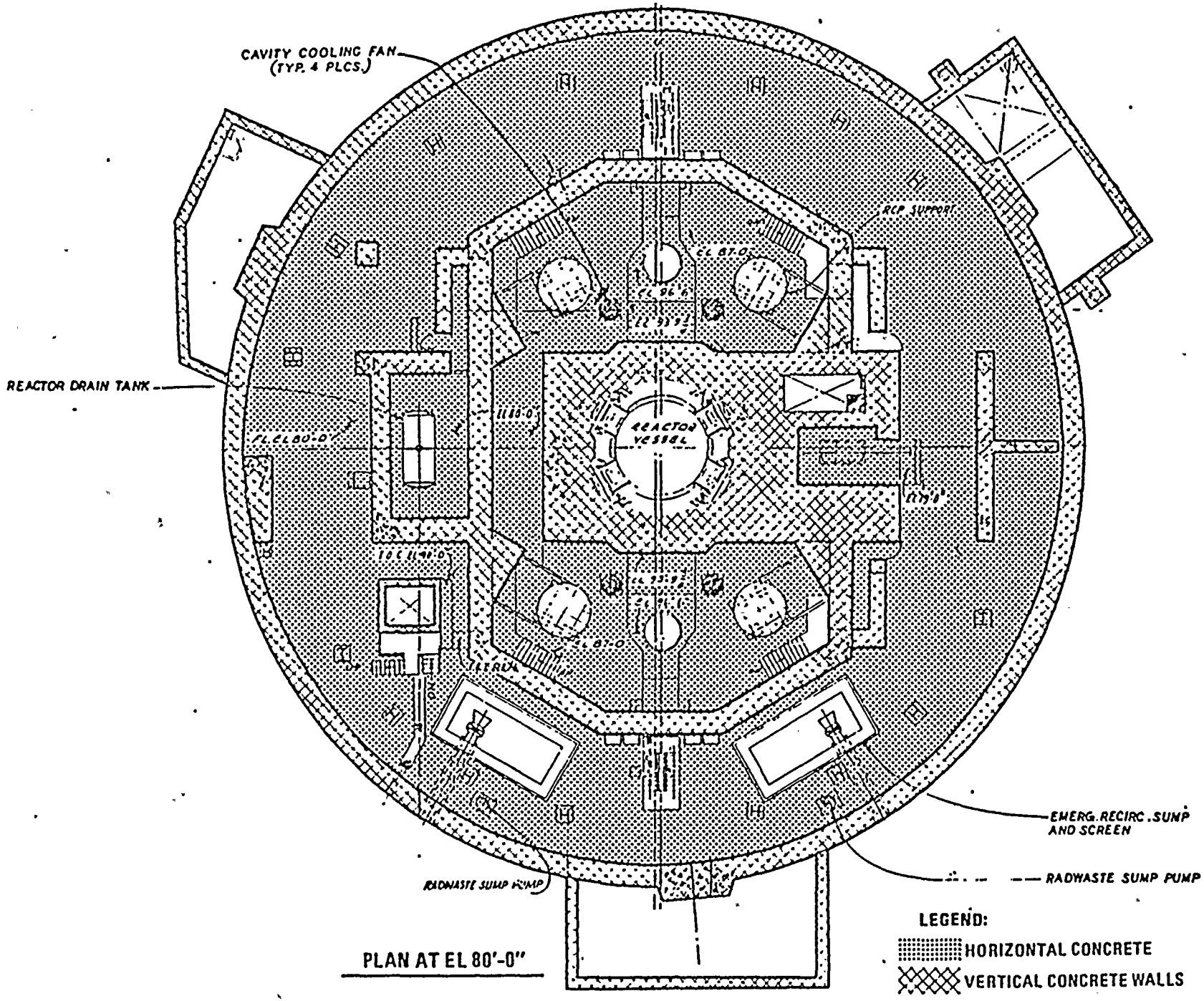
VERTICAL CONCRETE WALLS

Figure 2



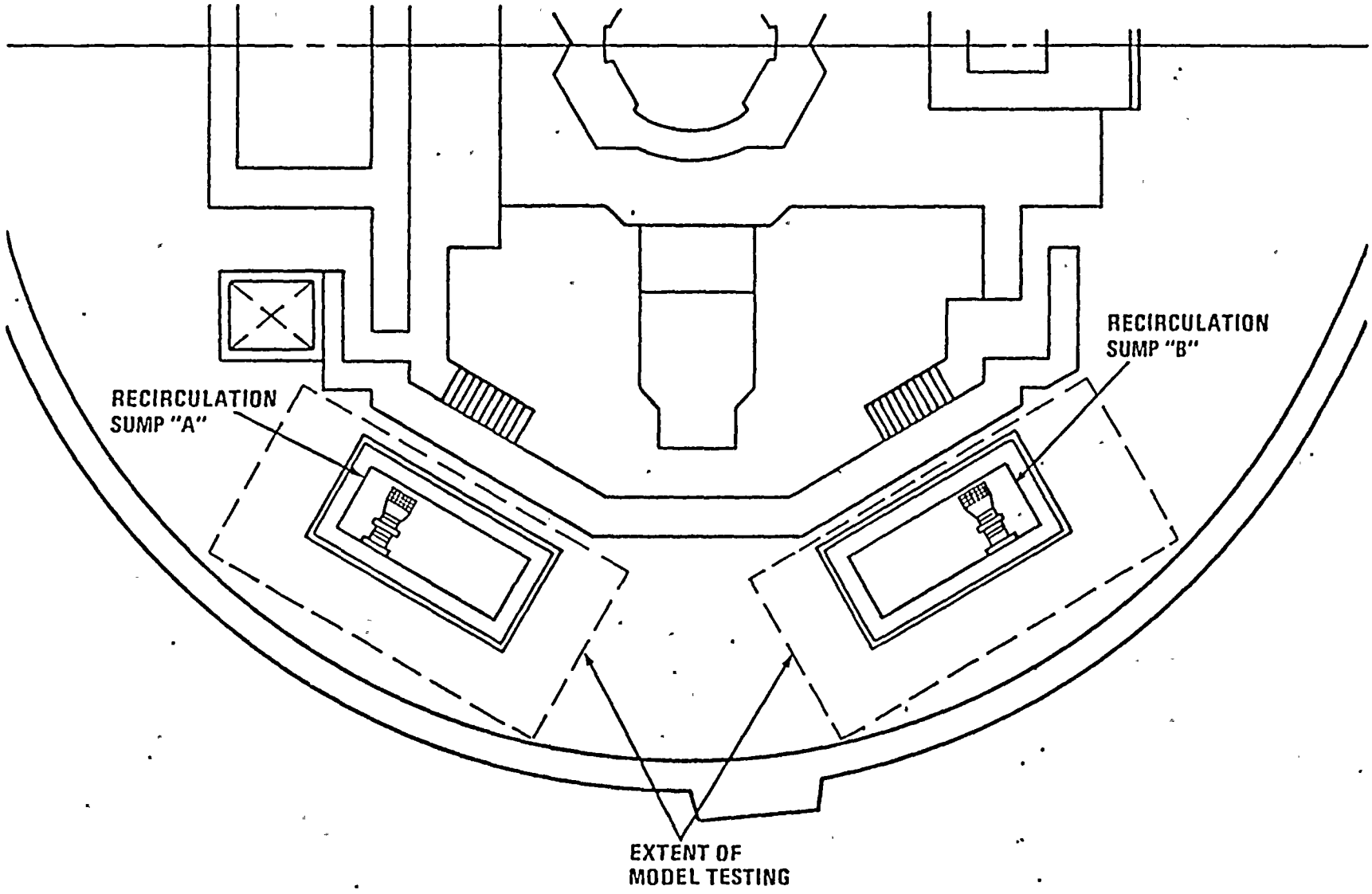
PLAN AT EL 100'-0"

Figure 3

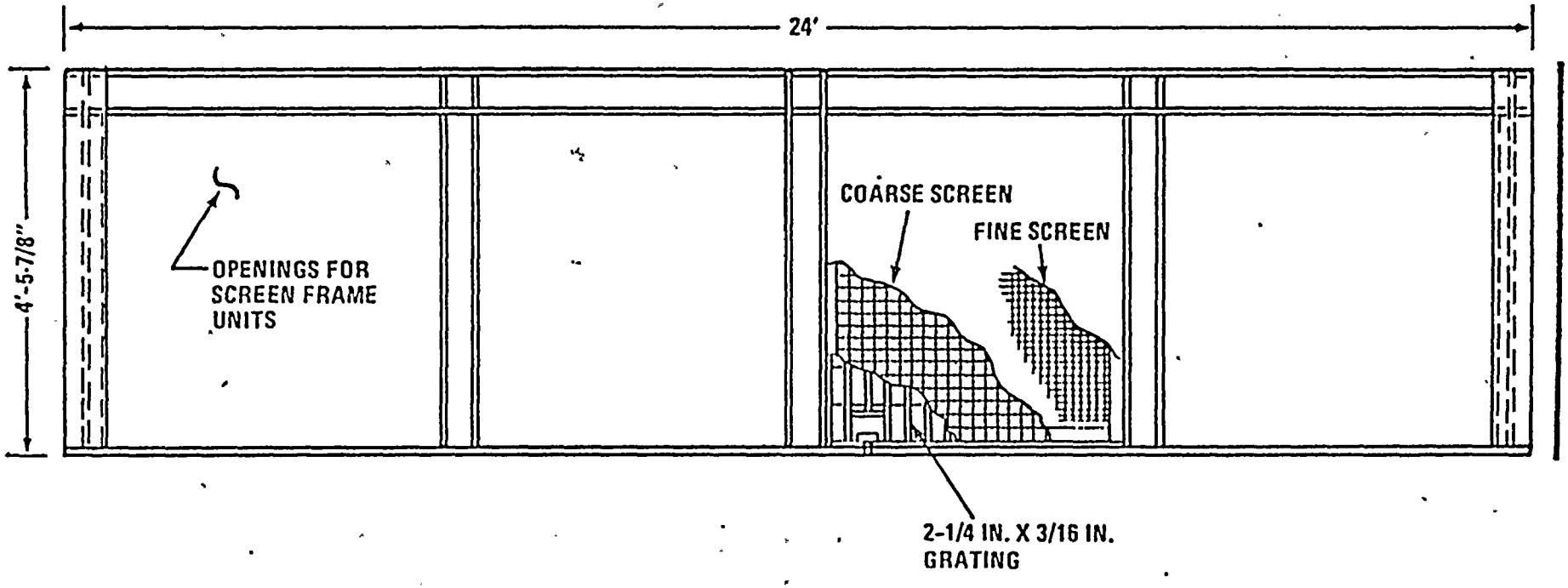


PLAN AT EL 80'-0"

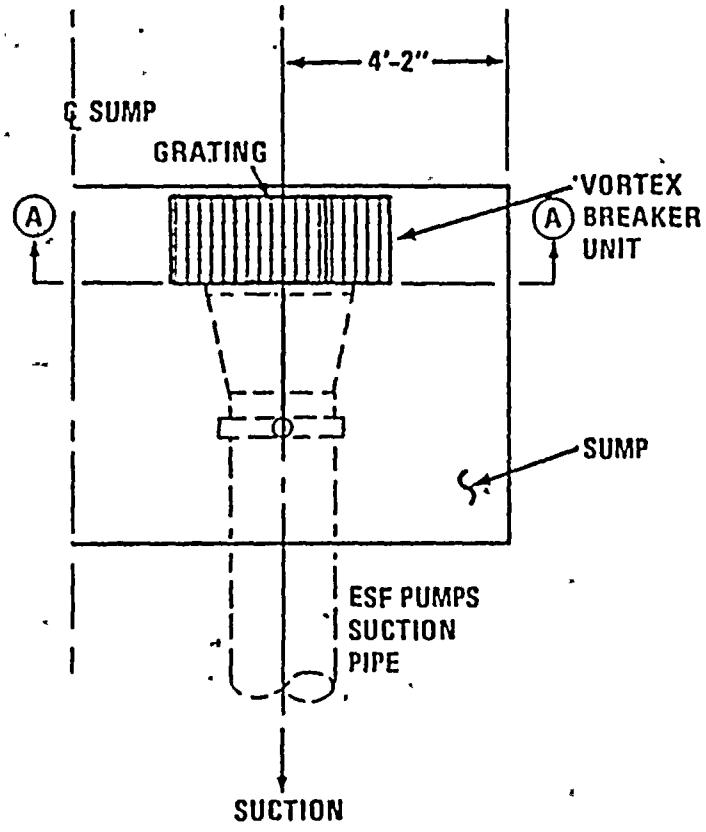
Figure 4



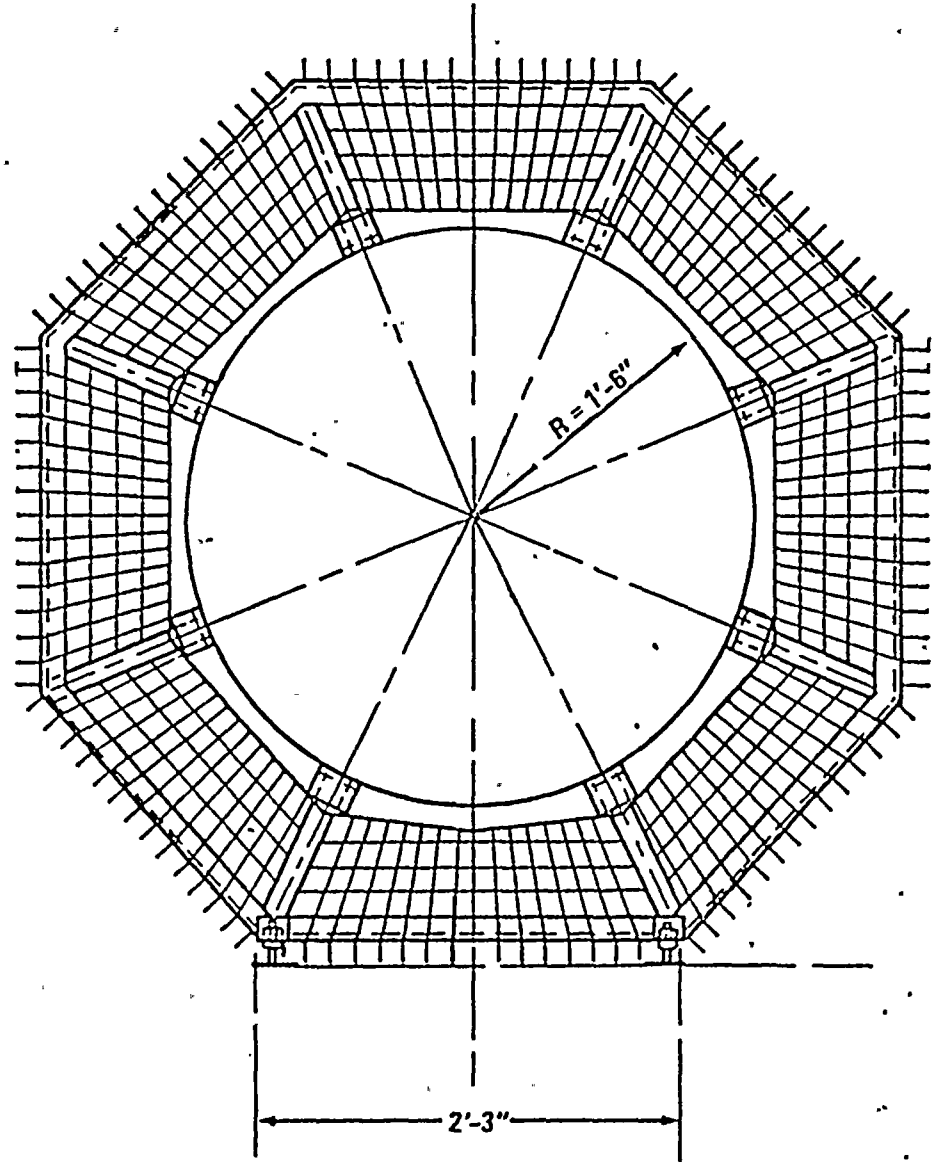
RECIRCULATION SUMPS
CONTAINMENT BLDG. EL. 80'
FIGURE 2-5



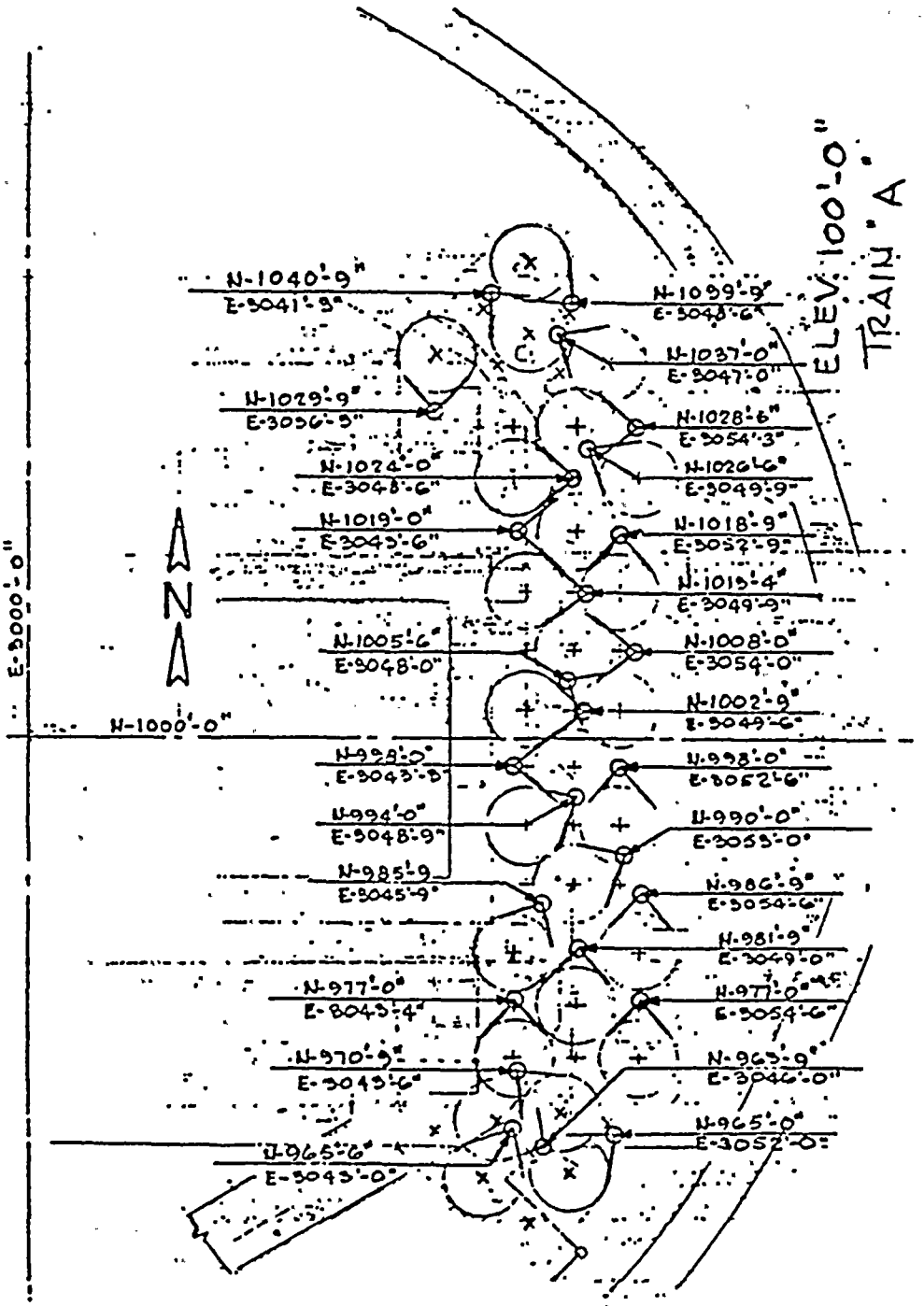
CONTAINMENT SUMP SCREENS AND GRATING - ELEVATION VIEW
FIGURE 2-6



CONTAINMENT SUMP PIPE AND VORTEX-BREAKING UNIT
PLAN VIEW (TYPICAL)
FIGURE 2-8

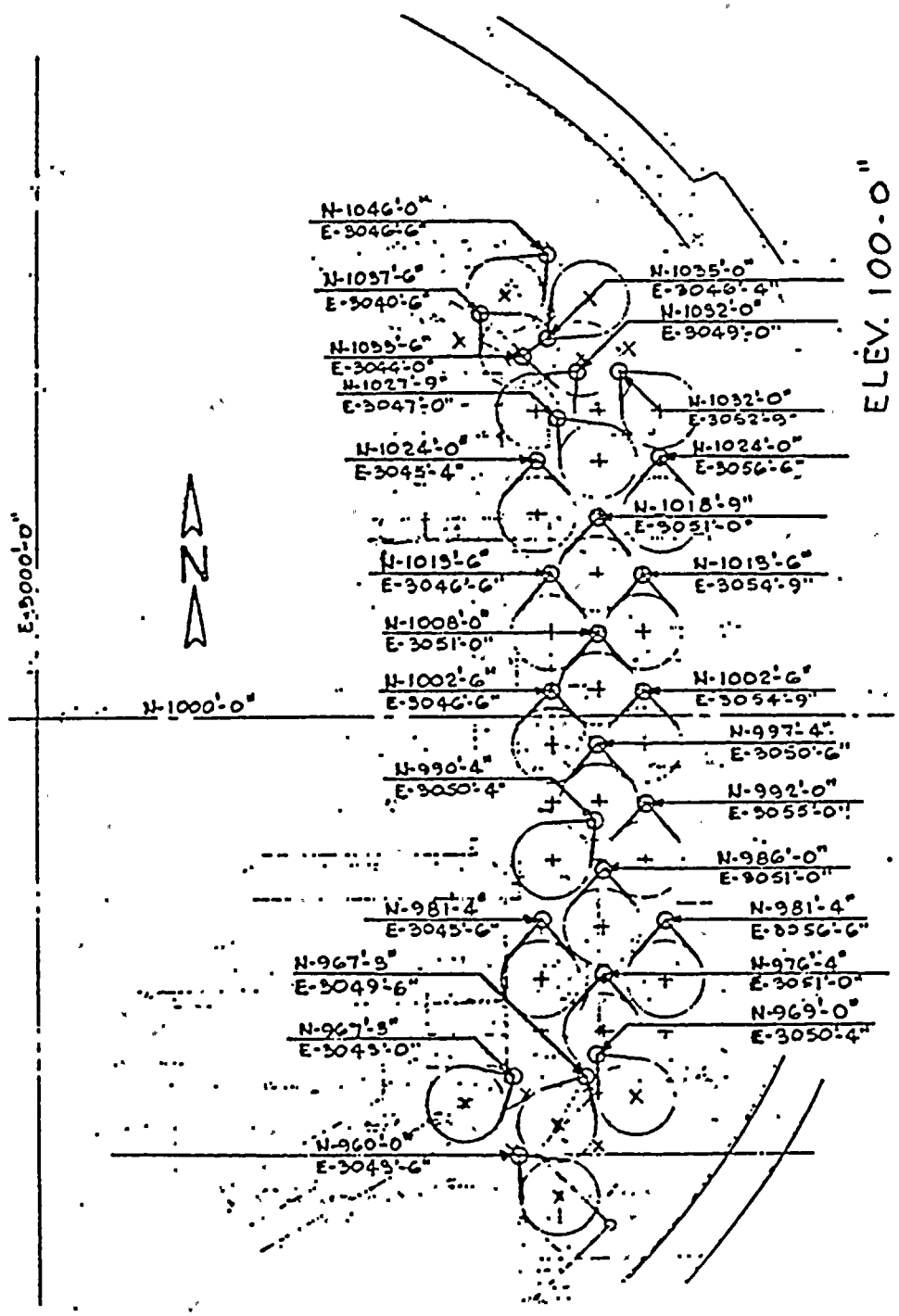


VORTEX - BREAKING UNIT -
SECTION "A"
FIGURE 2-9



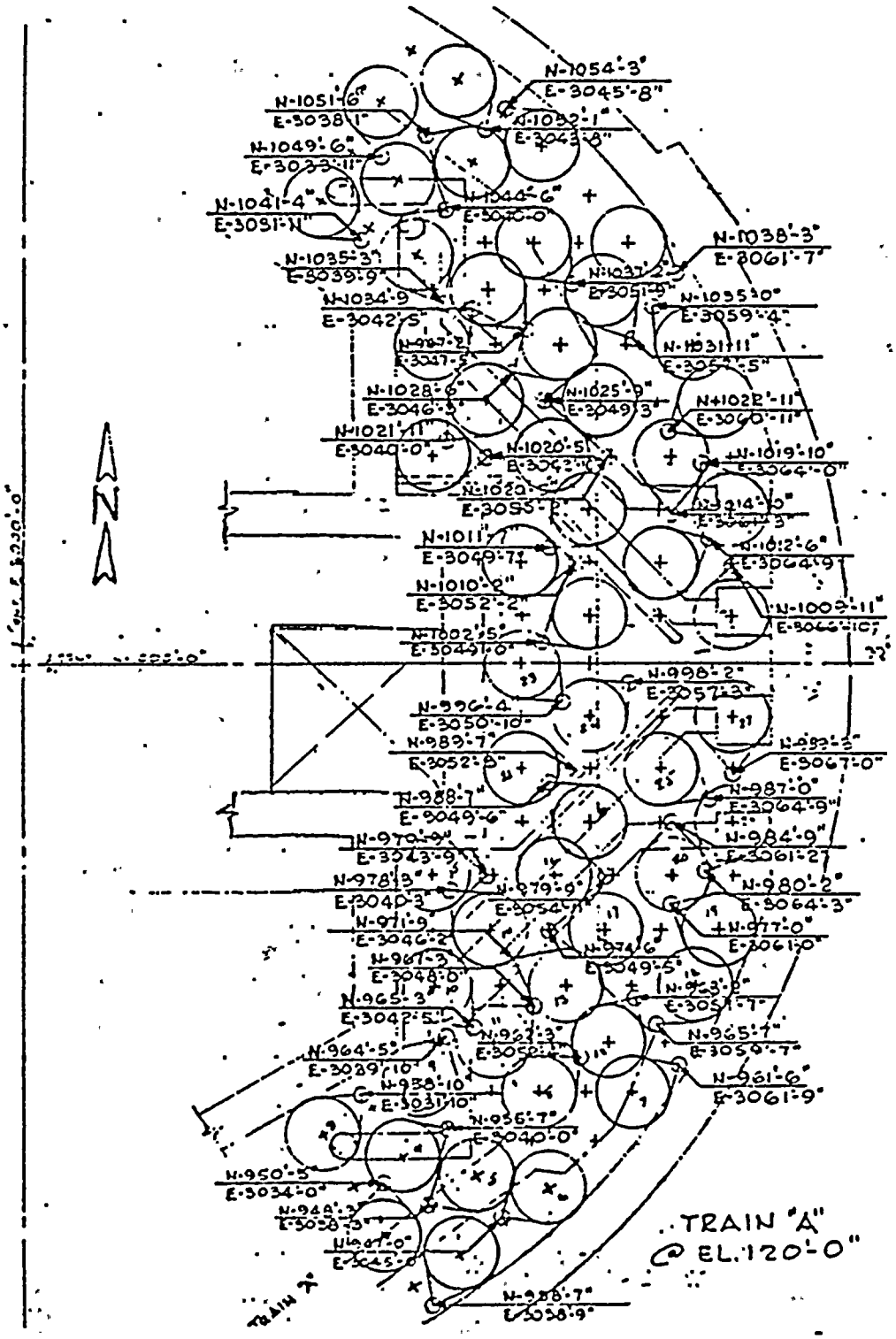
AUXILIARY SPRAY PATTERNS
Figure 2-11

07-28-81



AUXILIARY SPRAY PATTERNS
Figure 2-12

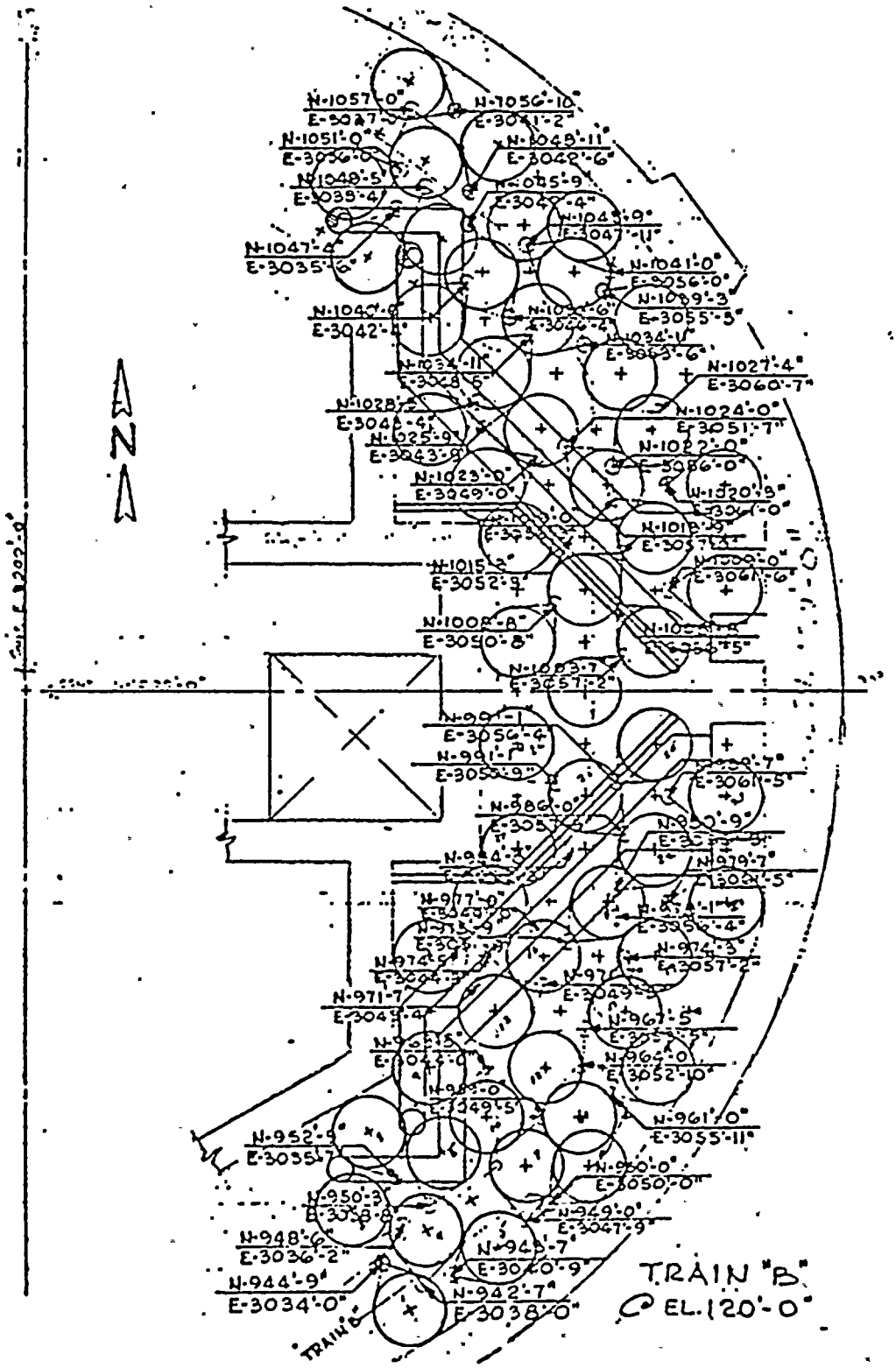
C 7-28-81



AUXILIARY SPRAY PATTERNS

Figure 2-13

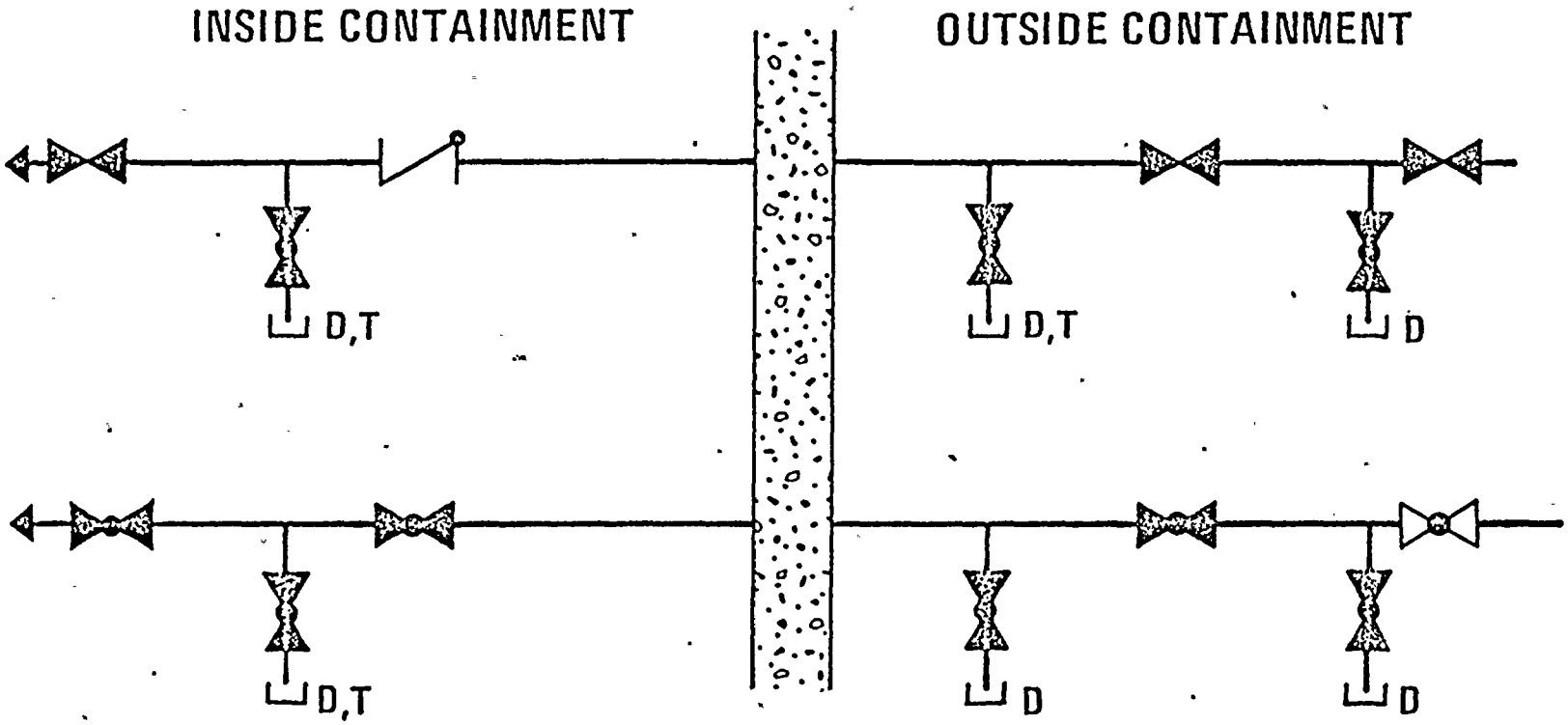
07-28-81



AUXILIARY SPRAY PATTERNS

Figure 2-14

07-28-81



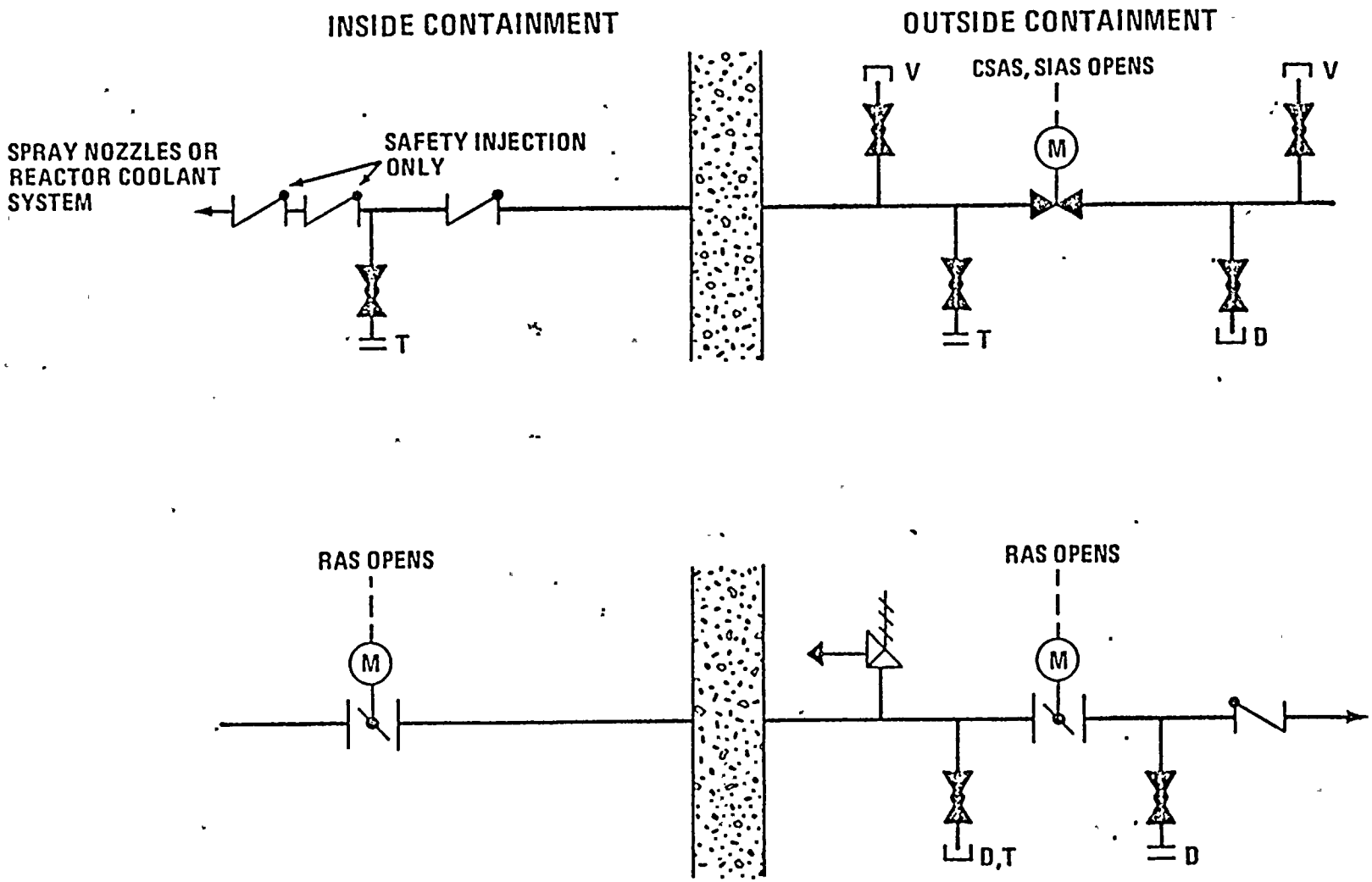
LEGEND:

D = DRAIN
T = TEST
V = VENT

TYPE "A" PENETRATION ARRANGEMENT
(TYPICAL FOR SERVICE AIR, FIRE PROTECTION
AND DEMINERALIZED WATER)

FIGURE 3-1

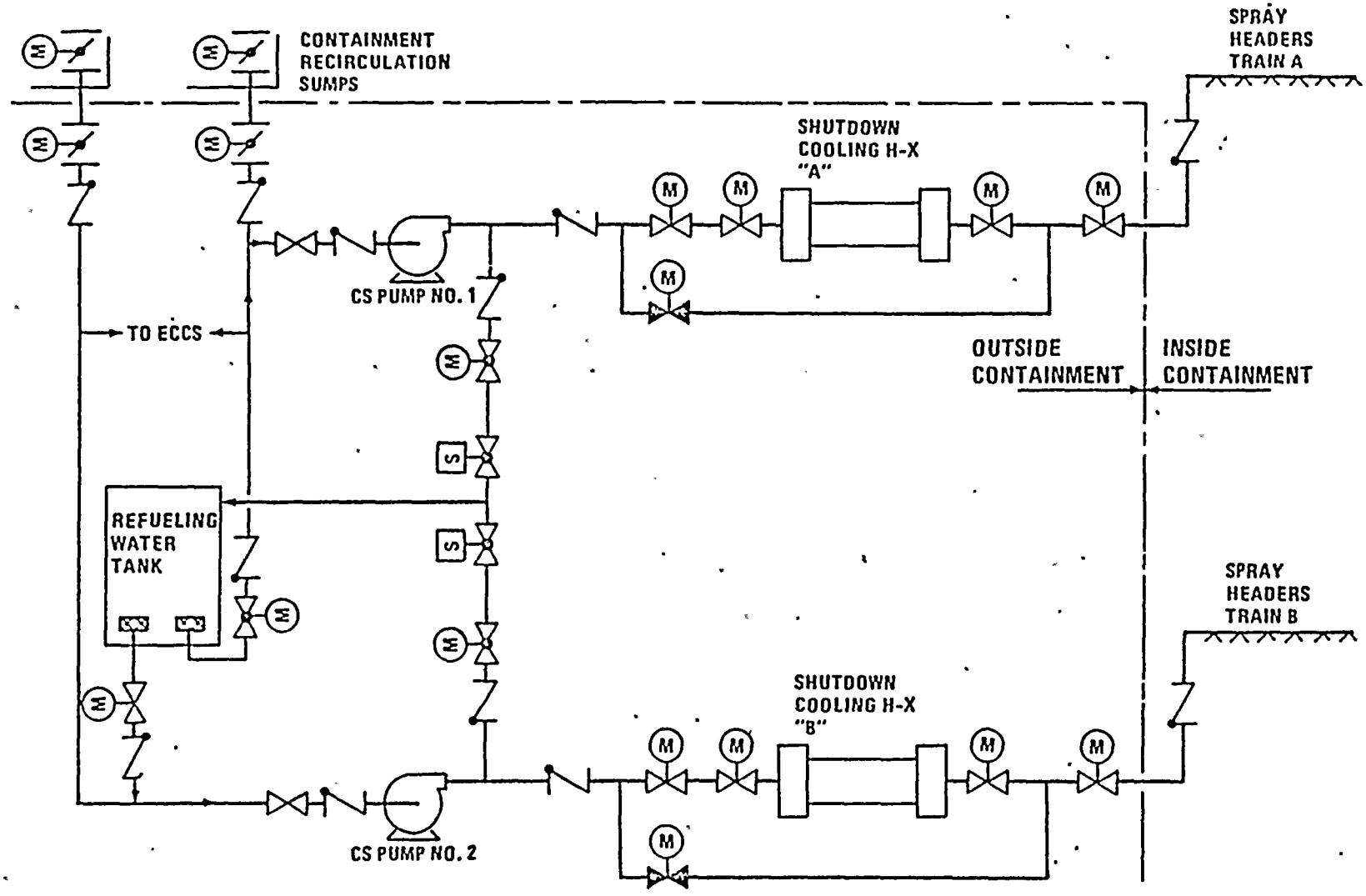
6-23-81



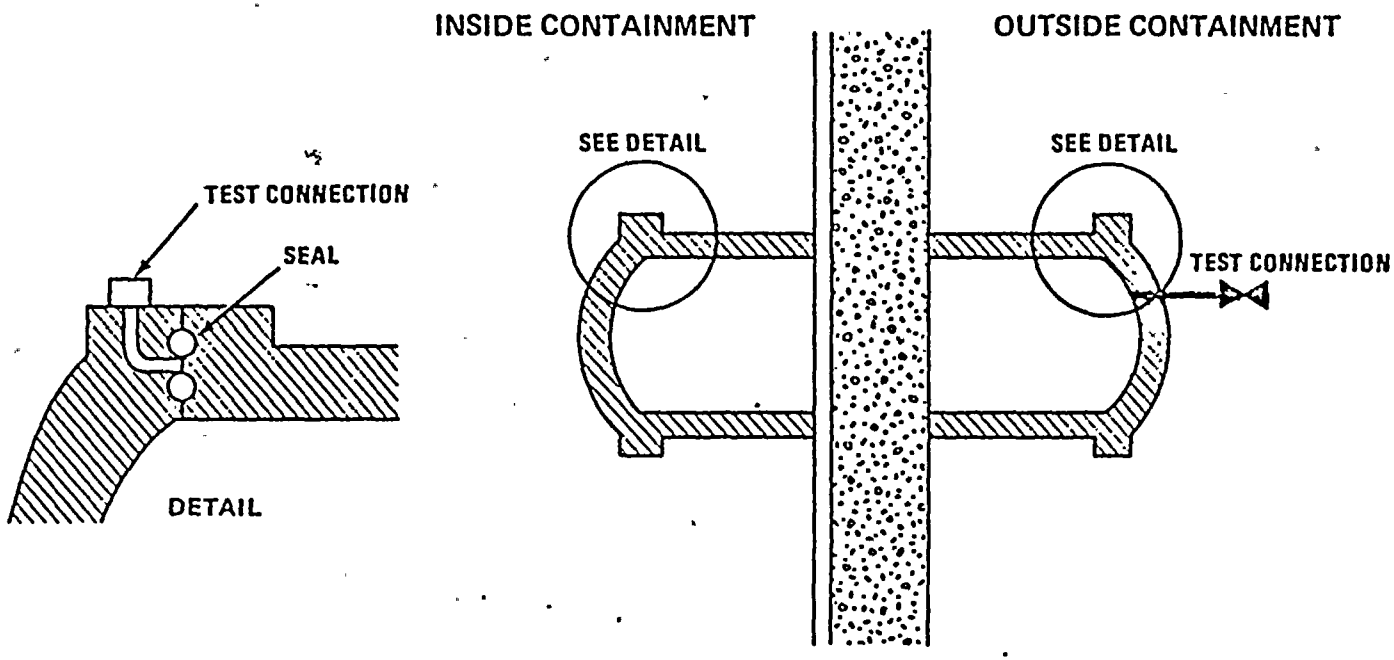
6-23-81

TYPE "C" PENETRATION ARRANGEMENT
(TYPICAL FOR SAFETY INJECTION, CONTAINMENT SPRAY, AND RECIRCULATION SUMP PIPING)

FIGURE 3-3



CONTAINMENT SPRAY SYSTEM
FIGURE 2-1



TYPE "F" PENETRATION ARRANGEMENT
TYPICAL FOR PERSONNEL HATCHES
(DETAIL TYPICAL FOR BLIND FLANGED PENETRATIONS)
FIGURE 3-7

4) CERTAIN PENETRATIONS ARE NOT ISOLATED FOLLOWING AN ACCIDENT:

- IT IS DESIRABLE TO LEAVE REACTOR COOLANT PUMP SEAL INJECTION AND CHEMICAL AND VOLUME CONTROL SYSTEM (CVCS) CHARGING PATHS OPEN TO PROVIDE ADDITIONAL CORE PROTECTION AFTER AN ACCIDENT IN WHICH OFFSITE POWER IS AVAILABLE.

- CHARGING PUMPS ARE AUTOMATICALLY TRANSFERRED TO EMERGENCY POWER IN THE EVENT THAT OFFSITE POWER IS LOST.

- UNDESIRABLE TO LOSE CHARGING OR SEAL INJECTION CAPABILITY DURING NORMAL OPERATION DUE TO AN INADVERTENT CIAS. THE POTENTIAL RELEASE OF FISSION PRODUCTS THROUGH THE PENETRATION IS NOT A CONCERN FOR THE FOLLOWING REASONS:

  (1) FLOW IS INTO THE CONTAINMENT AND RCS.

  (2) CHECK VALVES INSIDE THE CONTAINMENT PREVENT BACKFLOW OUT OF THE CONTAINMENT IF THE CHARGING PUMPS STOP.

  (3) CONNECTING PORTIONS OF THE CVCS OUTSIDE OF CONTAINMENT ARE DESIGNED TO SAFETY CLASS 2, SEISMIC CATEGORY I STANDARDS AND HAVE A DESIGN PRESSURE WELL IN EXCESS OF CONTAINMENT DESIGN PRESSURE.

  (4) OPERATOR HAS THE CAPABILITY OF ISOLATING THESE LINES IF CONTINUED CHARGING OR SEAL INJECTION PROVES TO BE UNNECESSARY.

SRP ACCEPTANCE CRITERIA

GDC 56, PRIMARY CONTAINMENT ISOLATION

REQUIREMENT

EACH LINE THAT CONNECTS DIRECTLY TO THE CONTAINMENT ATMOSPHERE AND PENETRATES PRIMARY REACTOR CONTAINMENT SHALL BE PROVIDED WITH CONTAINMENT ISOLATION VALVES AS FOLLOWS, UNLESS IT CAN BE DEMONSTRATED THAT THE CONTAINMENT ISOLATION PROVISIONS FOR A SPECIFIC CLASS OF LINES, SUCH AS INSTRUMENT LINES, ARE ACCEPTABLE ON SOME OTHER DEFINED BASIS:

(1) ONE LOCKED CLOSED ISOLATION VALVE INSIDE AND ONE LOCKED CLOSED ISOLATION VALVE OUTSIDE CONTAINMENT; OR

(2) ONE AUTOMATIC ISOLATION VALVE INSIDE AND ONE LOCKED CLOSED ISOLATION VALVE OUTSIDE CONTAINMENT; OR

(3) ONE LOCKED CLOSED ISOLATION VALVE INSIDE AND ONE AUTOMATIC ISOLATION VALVE OUTSIDE CONTAINMENT. A SIMPLE CHECK VALVE MAY NOT BE USED AS THE AUTOMATIC ISOLATION VALVE OUTSIDE CONTAINMENT; OR

(4) ONE AUTOMATIC ISOLATION VALVE INSIDE AND ONE AUTOMATIC ISOLATION VALVE OUTSIDE CONTAINMENT. A SIMPLE CHECK VALVE MAY NOT BE USED AS THE AUTOMATIC ISOLATION VALVE OUTSIDE CONTAINMENT.

DESIGN FEATURE

IN COMPLIANCE. THE CONTAINMENT PRESSURE INSTRUMENT CONNECTIONS ARE CONSIDERED PART OF THE CONTAINMENT BOUNDARY. THE HATCHES, LOCKS, AND DOUBLE-FLANGED CONNECTIONS ARE ALSO CONSIDERED PART OF THE CONTAINMENT BOUNDARY.

EXHIBIT 3-27

SRP ACCEPTANCE CRITERIA

RG 1.141, CONTAINMENT ISOLATION PROVISIONS FOR FLUID SYSTEMS
REF: ANSI N271-1976

	REQUIREMENT	DESIGN FEATURE
1)	FOR THE ISOLATION FUNCTION, ONE ISOLATION BARRIER IS REQUIRED AFTER THE OCCURRENCE OF A SINGLE ACTIVE FAILURE IN THE ISOLATION PROVISIONS.	IN COMPLIANCE
2)	ALL CONTAINMENT ISOLATION VALVES MUST BE CAPABLE OF TIGHT SHUTOFF AGAINST LEAKAGE TO MEET THE REQUIREMENTS OF 10CFR50, APP. J. A CONTAINMENT ISOLATION VALVE CAN BE AN AUTOMATIC ISOLATION VALVE, A SEALED CLOSED VALVE, OR A REMOTE MANUAL VALVE.	IN COMPLIANCE
3)	IF A CLOSED SYSTEM INSIDE CONTAINMENT IS USED AS ONE OF THE TWO CONTAINMENT ISOLATION BARRIERS, IT SHALL MEET THE CRITERIA THAT FOLLOW. HOWEVER, IF THESE CRITERIA CANNOT BE FULLY MET, THEN GDC 56 SHALL BE MET.	IN COMPLIANCE. PVNGS USES THE MORE STRINGENT GDC 56 FOR CLOSED SYSTEMS OTHER THAN THE MAIN STEAM AND FEEDWATER SYSTEMS.

SRP ACCEPTANCE CRITERIA

RG 1.141, CONTAINMENT ISOLATION PROVISIONS FOR FLUID SYSTEMS (CONT'D)
REF: ANSI N271-1976

REQUIREMENT	DESIGN FEATURE
4) OTHER DEFINED BASES	
A. GDC 55 AND 56 REQUIRE THAT EACH LINE THAT PENETRATES THE CONTAINMENT AND IS PART OF THE REACTOR COOLANT PRESSURE BOUNDARY OR IS CONNECTED DIRECTLY TO THE CONTAINMENT ATMOSPHERE HAVE ONE ISOLATION VALVE INSIDE AND ONE ISOLATION VALVE OUTSIDE CONTAINMENT.	IN COMPLIANCE
B. A SUITABLE BASIS FOR DEMONSTRATING THE ACCEPTABILITY OF INSTRUMENT LINES PENETRATING CONTAINMENT IS AVAILABLE. IN ADDITION, INSTRUMENT LINES WITH CLOSED SYSTEMS BOTH INSIDE AND OUTSIDE OF CONTAINMENT, SUCH AS CONTAINMENT PRESSURE INSTRUMENTATION, WHICH ARE FABRICATED TO WITHSTAND THE MAXIMUM CONTAINMENT TEST PRESSURE OF THE STRUCTURAL INTEGRITY TEST, THE MAXIMUM CONTAINMENT TEMPERATURE, AND ARE PROTECTED FROM MISSILES AND DYNAMIC EFFECTS ARE ACCEPTABLE WITHOUT ISOLATION VALVES.	IN COMPLIANCE PER REGULATORY GUIDE 1.11

EXHIBIT 3-34

SRP ACCEPTANCE CRITERIA

RG 1.141, CONTAINMENT ISOLATION PROVISIONS FOR FLUID SYSTEMS (CONT'D)
REF: ANSI N271-1976

REQUIREMENT	DESIGN FEATURE
C. ISOLATION PROVISIONS MAY USE A REMOTE MANUAL VALVE INSTEAD OF AN AUTOMATIC ISOLATION VALVE OUTSIDE CONTAINMENT.	IN COMPLIANCE
D. RELIEF VALVES IN THE BACKFLOW DIRECTION MAY BE EMPLOYED AS ISOLATION VALVES PROVIDED THEY SATISFY THE REQUIREMENTS OF THIS STANDARD.	IN COMPLIANCE

SRP ACCEPTANCE CRITERIA

RG 1.141, CONTAINMENT ISOLATION PROVISIONS FOR FLUID SYSTEMS (CONT'D)
REF: ANSI N271-1976

REQUIREMENT	DESIGN FEATURE
E. IF A CLOSED SYSTEM OUTSIDE CONTAINMENT IS USED AS ONE OF THE TWO CONTAINMENT ISOLATION BARRIERS FOR AN ESF THE CLOSED SYSTEM SHALL: (1) NOT COMMUNICATE WITH THE OUTSIDE ATMOSPHERE (2) MEET SAFETY CLASS 2 DESIGN REQUIREMENTS (3) WITHSTAND TEMPERATURE AND INTERNAL PRESSURE EQUAL TO THE CONTAINMENT DESIGN CONDITIONS (4) WITHSTAND LOCA TRANSIENT AND ENVIRONMENT (5) MEET SEISMIC CATEGORY I DESIGN REQUIREMENTS (6) BE PROTECTED AGAINST OVERPRESSURE FROM THERMAL EXPANSION WHEN ISOLATED, IF REQUIRED (7) BE PROTECTED AGAINST A HIGH ENERGY LINE BREAK OUTSIDE OF CONTAINMENT WHEN THE CLOSED SYSTEM IS NEEDED FOR CONTAINMENT ISOLATION.	IN COMPLIANCE

SRP ACCEPTANCE CRITERIA

RG 1.141, CONTAINMENT ISOLATION PROVISIONS FOR FLUID SYSTEMS (CONT'D)
REF: ANSI N271-1976

REQUIREMENT	DESIGN FEATURE
5) PIPING WHICH IS OUTSIDE THE CONTAINMENT AND IS EITHER BETWEEN THE CONTAINMENT AND THE OUTSIDE ISOLATION VALVE OR BETWEEN TWO OUTSIDE ISOLATION VALVES SHALL:	IN COMPLIANCE
(1) MEET SAFETY CLASS 2 DESIGN REQUIREMENTS	
(2) WITHSTAND THE CONTAINMENT DESIGN TEMPERATURE	
(3) WITHSTAND INTERNAL PRESSURE FROM CONTAINMENT STRUCTURAL INTEGRITY TEST	
(4) WITHSTAND LOCA TRANSIENT AND ENVIRONMENT	
(5) MEET SEISMIC CATEGORY I DESIGN REQUIREMENTS	
(6) BE PROTECTED AGAINST A HIGH ENERGY LINE BREAK OUTSIDE OF CONTAINMENT WHEN NEEDED FOR CONTAINMENT ISOLATION.	

RG 1.141, CONTAINMENT ISOLATION PROVISIONS FOR FLUID SYSTEMS (CONT'D)
REF: ANSI N271-1976

REQUIREMENT	DESIGN FEATURE
6) DESIGN REQUIREMENT	
A. AS A MINIMUM, CONTAINMENT ISOLATION PROVISIONS INSIDE THE CONTAINMENT SHALL BE DESIGNED TO WITHSTAND THE MAXIMUM CONTAINMENT TEMPERATURE AND, NON-CONCURRENTLY, THE CONTAINMENT PRESSURE RESULTING FROM THE STRUCTURAL INTEGRITY TEST AND THE APPROPRIATE COMBINATIONS OF DESIGN CONDITIONS.	IN COMPLIANCE
B. ALL POWER-OPERATED ISOLATION VALVES SHALL BE CAPABLE OF REMOTE MANUAL ACTUATION FROM THE MAIN CONTROL ROOM.	IN COMPLIANCE
C. ALL POWER-OPERATED ISOLATION VALVES SHALL HAVE PROVISIONS IN THE CONTROL ROOM FOR INDICATION OF THE STATUS OF THE VALVE SHOWING OPEN AND CLOSED POSITIONS.	IN COMPLIANCE
D. ISOLATION VALVE CLOSURE SHALL BE COMPLETED WHEN AN ISOLATION SIGNAL IS RECEIVED AND THE VALVE SHALL NOT BE OPENED UNTIL THE SIGNAL IS REMOVED AND DELIBERATE OPERATOR ACTION IS TAKEN (RESET SWITCH).	IN COMPLIANCE

SRP ACCEPTANCE CRITERIA

RG 1.141, CONTAINMENT ISOLATION PROVISIONS FOR FLUID SYSTEMS (CONT'D)
REF: ANSI N271-1976

	REQUIREMENT	DESIGN FEATURE
E.	DIVERSITY IN MEANS OF ACTUATION OF AUTOMATIC ISOLATION VALVES IN SERIES SHOULD BE CONSIDERED TO PRECLUDE COMMON MODE FAILURE.	IN COMPLIANCE
F.	CONTAINMENT ISOLATION VALVES SHALL BE PROVIDED WITH ACTUATION FEATURES APPROPRIATE TO THE VALVE TYPE AND REQUIRED CLOSURE TIME.	IN COMPLIANCE
G.	THE POSITION OF AN ISOLATION VALVE FOR NORMAL AND SHUTDOWN PLANT OPERATING CONDITIONS DEPENDS ON THE FLUID SYSTEM REQUIREMENTS.	IN COMPLIANCE
H.	THE OBJECTIVE IN ESTABLISHING VALVE CLOSURE TIMES SHOULD BE TO LIMIT TO AS LOW AS REASONABLY ATTAINABLE THE RELEASE OF RADIO-ACTIVITY FROM THE CONTAINMENT.	IN COMPLIANCE
I.	A CONTAINMENT ISOLATION SIGNAL INITIATES CLOSING OF ISOLATION VALVES IN THOSE LINES THAT MUST BE ISOLATED IMMEDIATELY FOLLOWING AN ACCIDENT.	IN COMPLIANCE

SRP ACCEPTANCE CRITERIA

RG 1.141, CONTAINMENT ISOLATION PROVISIONS FOR FLUID SYSTEMS (CONT'D)
REF: ANSI N271-1976

	REQUIREMENT	DESIGN FEATURE
N.	CONTAINMENT ISOLATION BARRIERS ARE ASSIGNED TO EITHER SAFETY CLASS 1 OR 2 IN ACCORDANCE WITH AMERICAN NATIONAL STANDARD N18.2-1973, N18.2A-1975 (ANS 51.1).	IN COMPLIANCE
O.	PROTECTION FOR CONTAINMENT ISOLATION PROVISIONS AGAINST LOSS OF FUNCTION FROM MISSILES, PIPE WHIP, AND JET FORCE SHALL BE CONSIDERED.	IN COMPLIANCE
P.	PROTECTION FOR CONTAINMENT ISOLATION PROVISIONS AGAINST LOSS OF FUNCTION FROM FLOODING SHALL BE CONSIDERED.	IN COMPLIANCE
Q.	PROTECTION FOR CONTAINMENT ISOLATION PROVISIONS AGAINST LOSS OF FUNCTION FROM EARTHQUAKES SHALL BE PROVIDED.	IN COMPLIANCE
R.	PROTECTION FOR CONTAINMENT ISOLATION PROVISIONS AGAINST LOSS OF FUNCTION FROM FIRE SHALL BE CONSIDERED.	IN COMPLIANCE

SRP ACCEPTANCE CRITERIA

RG 1.141, CONTAINMENT ISOLATION PROVISIONS FOR FLUID SYSTEMS (CONT'D)
REF: ANSI N271-1976

	REQUIREMENT	DESIGN FEATURE
S.	THE PHYSICAL SEPARATION ASPECTS OF CONTAINMENT ISOLATION PROVISIONS SHALL BE CONSIDERED.	IN COMPLIANCE
T.	THE CONTAINMENT ISOLATION LOCATED INSIDE THE CONTAINMENT SHALL BE DESIGNED TO FUNCTION UNDER THE APPROPRIATE COMBINATIONS OF CONDITIONS FOR NORMAL OPERATION, THE LOCA AND ANY MORE SEVERE LOCAL ACCIDENTS.	IN COMPLIANCE
U.	THE CONTAINMENT ISOLATION PROVISIONS LOCATED OUTSIDE THE CONTAINMENT SHALL BE DESIGNED TO FUNCTION UNDER THE MOST ADVERSE ANTICIPATED ENVIRONMENTAL CONDITIONS TO WHICH THEY MAY BE EXPOSED.	IN COMPLIANCE
V.	CONTAINMENT ISOLATION PROVISIONS SHALL BE DESIGNED TO BE OPERABLE UNDER THE MAXIMUM INTEGRATED RADIATION DOSES TO WHICH THEY MAY BE EXPOSED DURING THEIR SERVICE LIFE IN THE PLANT.	IN COMPLIANCE

EXHIBIT 3-42

SRP ACCEPTANCE CRITERIA

RG 1.141, CONTAINMENT ISOLATION PROVISIONS FOR FLUID SYSTEMS (CONT'D)
REF: ANSI N271-1976

	REQUIREMENT	DESIGN FEATURE
W.	ISOLATION VALVES MAY BE GATE, GLOBE, BUTTERFLY, DIAPHRAGM, CHECK (SIMPLE CHECK VALVES ARE ACCEPTABLE ONLY INSIDE CONTAINMENT), BALL, PLUG, AND RELIEF VALVES, DEPENDING UPON THE FLUID SYSTEM REQUIREMENTS.	IN COMPLIANCE
X.	THE OBJECTIVE SHALL BE TO LIMIT VALVE LEAKAGE TO AS LOW AS REASONABLY ATTAINABLE.	IN COMPLIANCE
Y.	AMERICAN NATIONAL STANDARD SELF-OPERATED AND POWER-OPERATED SAFETY-RELATED VALVES FUNCTIONAL SPECIFICATION STANDARD, N278.1-1975, HAS BEEN ISSUED AND PROVIDES GUIDANCE ON VALVE OPERABILITY REQUIREMENTS FOR PREPARATION OF PURCHASER'S SPECIFICATION FOR ISOLATION VALVES.	IN COMPLIANCE
Z.	WHEN RELIEF VALVES DISCHARGE INTO THE CONTAINMENT AND ALSO SERVE AS ISOLATION VALVES, THE DISCHARGE SIDE OF THE VALVE SHALL BE DESIGNED TO WITHSTAND AND BE TESTED AT THE CONTAINMENT DESIGN PRESSURE.	IN COMPLIANCE

RG 1.141, CONTAINMENT ISOLATION PROVISIONS FOR FLUID SYSTEMS (CONT'D)
REF: ANSI N271-1976

	REQUIREMENT	DESIGN FEATURE
AA.	SUITABLE GUIDANCE FOR ISOLATION PROVISIONS ON INSTRUMENT LINES PENETRATING THE CONTAINMENT IS AVAILABLE. (RG 1.11)	IN COMPLIANCE
BB.	ELECTRICAL POWER-OPERATORS SHALL BE ASSIGNED CLASS 1E.	IN COMPLIANCE
CC.	FLANGED CLOSURES ARE UNDER ADMINISTRATIVE CONTROLS SIMILAR TO MANUAL VALVES.	IN COMPLIANCE
DD.	A SYSTEM FOR PROVIDING A SEALING FLUID OR VACUUM BETWEEN ISOLATION VALVES OR ISOLATION BARRIERS MAY BE REQUIRED WHEN SITE POPULATION DENSITY CONDITIONS REQUIRE THE LOWEST PRACTICABLE LEAKAGE THROUGH THE CONTAINMENT ISOLATION BARRIERS OR THE LEAKAGE RATE REQUIREMENTS OF 10CFR50, APPENDIX J CANNOT OTHERWISE BE MET.	A SEAL SYSTEM IS NOT REQUIRED AT PVNGS.
EE.	REMOTE MANUAL VALVES MAY BE PROVIDED ON ESF OR ESF-RELATED SYSTEMS IN ORDER TO MAINTAIN CONTAINMENT OR PRESERVE SYSTEM FUNCTION IN THE EVENT OF A LEAK OR LINE BREAK IN SUCH SYSTEMS.	IN COMPLIANCE

EXHIBIT 3-44

FOR FLUID SYSTEMS (CONT'D

RG 1.141, CONTAINMENT ISOLATION PROVISIONS FOR FLUID SYSTEMS (CONT'D)
REF: ANSI N271-1976

	REQUIREMENT	DESIGN FEATURE
FF.	THE PIPING BETWEEN ISOLATION BARRIERS OR THE PIPING WHICH FORMS PART OF ISOLATION BARRIERS SHALL MEET THE REQUIREMENTS OF SECTION 5 OF THIS STANDARD AND APPLICABLE REQUIREMENTS FOR ISOLATION BARRIERS.	IN COMPLIANCE.
7)	TESTING	
A.	THE RULES OF SUBSECTION IWV OF ASME B&PV SECTION XI FOR VALVE EXERCISING PRESENT REQUIREMENTS FOR ISOLATION VALVE OPERABILITY TESTING THAT SHALL BE FOLLOWED AFTER THE ISOLATION VALVE IS INSTALLED IN THE PLANT.	IN COMPLIANCE
B.	10CFR50, APPENDIX J SHALL BE FOLLOWED FOR ISOLATION BARRIER LEAKAGE RATE TESTING.	IN COMPLIANCE
C.	PROVISIONS SHALL BE MADE FOR LEAKAGE RATE TESTING OF CONTAINMENT ISOLATION VALVES.	IN COMPLIANCE.

RG 1.141, CONTAINMENT ISOLATION PROVISIONS FOR FLUID SYSTEMS (CONT'D)
REF: ANSI N271-1976

REQUIREMENT	DESIGN FEATURE
8) MAINTENANCE	
A. THE DESIGN OF CONTAINMENT ISOLATION PROVISIONS SHALL PERMIT IMPLEMENTATION OF PREVENTIVE MAINTENANCE PROCEDURES FOR THE INSPECTION, ADJUSTMENT, SERVICING AND REPAIR OF SUCH PROVISIONS.	IN COMPLIANCE
B. PROCEDURES AND PREVENTIVE MAINTENANCE SCHEDULES SHALL BE PREPARED IN ACCORDANCE WITH AMERICAN NATIONAL STANDARD FOR ADMINISTRATIVE CONTROLS FOR NUCLEAR POWER PLANTS, N18.7-1972 (ANS-3.2).	PVNGS WILL COMPLY
C. A ROUTINE PREVENTIVE MAINTENANCE PROGRAM SHALL BE ESTABLISHED WHICH IS CONSISTENT WITH THE OPERATIONAL REQUIREMENTS AND PREVIOUS OPERATING EXPERIENCE ON THE ISOLATION PROVISIONS, INCLUDING PREVIOUS OPERATING EXPERIENCE ON SIMILAR ISOLATION PROVISIONS AT OTHER PLANTS.	PVNGS WILL COMPLY

RG 1.141, CONTAINMENT ISOLATION PROVISIONS FOR FLUID SYSTEMS (CONT'D)
REF: ANSI N271-1976

REQUIREMENT	DESIGN FEATURE
9) MATERIALS ISOLATION BARRIERS AND PIPING BETWEEN THEM SHALL MEET THE MATERIAL REQUIREMENTS FOR METAL PARTS AS SPECIFIED BY THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME) BOILER AND PRESSURE VESSEL CODE, SECTION III, DIVISION 1, SUBSECTION NA, "NUCLEAR POWER PLANT COMPONENTS."	IN COMPLIANCE

TABLE 3-2

NON-ESSENTIAL SYSTEMS PENETRATING THE PVNGS CONTAINMENT

SYSTEM	NORMAL POSITION	POST CIAS POSITION	NOTES
DEMINERALIZED WATER	C	C	LOCKED
FIRE PROTECTION	C	C	LOCKED
POOL COOLING	C	C	LOCKED
FUEL TRANSFER	C	C	FLANGED
CONTAINMENT TEST	C	C	FLANGED
SERVICE AIR	C	C	LOCKED
INTEGRATED LEAK RATE TEST	C	C	FLANGED
PERSONNEL LOCK	C	C	-
EQUIPMENT HATCH	C	C	-
EMERGENCY LOCK	C	C	-
PRESSURIZER SAMPLE - WATER	C	C	1
PRESSURIZER SAMPLE - STEAM	C	C	1
HOT LEG SAMPLE	C	C	1
HIGH PRESSURE NITROGEN	C	C	1
CONTAINMENT PURGE (REFUELING)	C	C	1,2
RADIATION MONITOR	O	C	1
LOW PRESSURE NITROGEN	O	C	1
INSTRUMENT AIR	O	C	1
NUCLEAR COOLING WATER	O	C	1
CVCS LETDOWN	O	C	1
REACTOR DRAIN TANK (RDT) VENT	O	C	1
CVCS RDT DRAIN/FILL	O	C	1
CHILLED WATER	O	C	1

EXHIBIT 3-57

COMBUSTIBLE GAS CONTROL IN CONTAINMENT
SYSTEM DESCRIPTION

1) THE CHRS CONSISTS OF TWO MOBILE, SAFETY-GRADE, THERMAL HYDROGEN RECOMBINERS CAPABLE OF PROCESSING 50 FT^3/MIN EACH OF CONTAINMENT ATMOSPHERE GAS CONTAINING UP TO 5% HYDROGEN. ALL EQUIPMENT IS LOCATED EXTERNAL TO CONTAINMENT EXCEPT PIPING, TWO MOTOR-OPERATED CONTAINMENT ISOLATION VALVES, AND TWO CHECK VALVES.

2) THE HYDROGEN PURGE FILTER UNIT CONSISTS OF A SINGLE, NON-SAFETY GRADE MOBILE HOUSING WITH A MOISTURE SEPARATOR, TWO HIGH EFFICIENCY PARTICULATE AIR (HEPA) FILTERS AND A CHARCOAL ADSORBER (NON-SAFETY GRADE) WITH A PROCESS CAPACITY OF 50 FT^3/MIN.

3) THE HYDROGEN ANALYZERS CONSIST OF TWO INSTRUMENTS WITH READOUT AND ALARMS IN THE CONTROL ROOM. THE ANALYZERS HAVE NO INTERACTION OR CONTROL FUNCTION WITH THE RECOMBINERS. THE ANALYZERS ARE NORMALLY IN A WARMUP MODE TO ALLOW OPERATION WITHIN 30 MINUTES OF AN ACCIDENT.

4) THE CONTAINMENT ISOLATION VALVES CONSIST OF SIX MOTOR-OPERATED VALVES (CLASS 1E) AND TWO CHECK VALVES (RECOMBINER EXHAUST TO CONTAINMENT).

EXHIBIT 4-3

COMBUSTIBLE GAS CONTROL IN CONTAINMENT
SYSTEM OPERATION

1) THE POST-ACCIDENT HYDROGEN ANALYZERS ARE PLACED IN OPERATION.

2) THE HYDROGEN RECOMBINERS INCLUDING CONTROL CABINETS ARE CONNECTED TO THE CONTAINMENT PENETRATIONS AND STARTED AT OR BELOW 3.5 VOLUME PERCENT HYDROGEN CONCENTRATION.

3) THE INLET GAS TEMPERATURE IS RAISED BY THE RECOMBINER HEATERS UNTIL HYDROGEN-OXYGEN REACTION STARTS (~ 1300F).

4) THE RECOMBINER BLOWER CREATES A DIFFERENTIAL PRESSURE TO RETURN THE RECOMBINER EXHAUST GAS TO CONTAINMENT.

5) THE PURGE SYSTEM MAY BE USED TO EXHAUST CONTAINMENT ATMOSPHERE THROUGH FILTERS TO THE OUTSIDE ENVIRONMENT AT A RATE OF 50 FT^3/MIN.

EXHIBIT 4-4

ITEM II.E.4.2 (CONTINUED)

REQUIREMENT	DESIGN FEATURE
3) (CONTINUED)	THE STEAM GENERATOR BLOWDOWN AND BLOWDOWN SAMPLE SYSTEMS ARE ISOLATED BY EITHER A MSIS, AFAS OR SIAS. THE SAFETY INJECTION DRAIN IS ISOLATED ON A SIAS. PLANT PARAMETERS WHICH GENERATE SIAS ALSO GENERATE CIAS. IT IS DESIRABLE TO LEAVE RCP SEAL INJECTION AND CVCS CHARGING PATHS OPEN TO PROVIDE ADDITIONAL CORE PROTECTION AFTER AN ACCIDENT IN WHICH OFFSITE POWER IS AVAILABLE. IN ADDITION, THE CHARGING PUMPS ARE AUTOMATICALLY TRANFERRED TO EMERGENCY POWER IN THE EVENT THAT OFFSITE POWER IS LOST. CONVERSELY, IT IS UNDESIRABLE TO LOSE CHARGING OR SEAL INJECTION CAPABILITY DURING NORMAL OPERATION DUE TO AN INADVERTENT CIAS. THE POTENTIAL RELEASE OF FISSION PRODUCTS THROUGH THE PENETRATION IS NOT A CONCERN FOR THE FOLLOWING REASONS: A. FLOW IS INTO THE CONTAINMENT AND RCS. B. CHECK VALVES INSIDE THE CONTAINMENT PREVENT BACKFLOW OUT OF THE CONTAINMENT IF THE CHARGING PUMPS STOP.

SRP ACCEPTANCE CRITERIA

RG 1.7, CONTROL OF COMBUSTIBLE GAS CONCENTRATIONS IN CONTAINMENT FOLLOWING A LOSS-OF-COOLANT ACCIDENT (CONT'D)

REQUIREMENT	DESIGN FEATURE
4) ALL WATER-COOLED POWER REACTORS SHOULD ALSO HAVE THE INSTALLED CAPABILITY FOR A CONTROLLED PURGE OF THE CONTAINMENT ATMOSPHERE TO AID IN CLEANUP. THE PURGE OR VENTILATION SYSTEM MAY BE A SEPARATE SYSTEM OR PART OF AN EXISTING SYSTEM. IT NEED NOT BE REDUNDANT OR BE DESIGNATED SEISMIC CATEGORY I, EXCEPT INSOFAR AS PORTIONS OF THE SYSTEM CONSTITUTE PART OF THE PRIMARY CONTAINMENT BOUNDARY OR CONTAIN FILTERS.	IN COMPLIANCE. A NON-SAFETY GRADE PURGE EXHAUST UNIT IS PROVIDED. I
5) DEFINED PARAMETER VALUES SHOULD BE USED IN (A) CALCULATING HYDROGEN AND OXYGEN GAS CONCENTRATIONS IN CONTAINMENTS AND (B) EVALUATING DESIGNS PROVIDED TO CONTROL AND TO PURGE COMBUSTIBLE GASES EVOLVED IN THE COURSE OF LOCAS. THESE VALUES MAY BE CHANGED ON THE BASIS OF ADDITIONAL EXPERIMENTAL EVIDENCE AND ANALYSES.	IN COMPLIANCE

COMBUSTIBLE GAS CONTROL
NUREG 0737

ITEM II.E.4.1

REQUIREMENT	DESIGN FEATURE
PLANTS USING EXTERNAL RECOMBINERS OR PURGE SYSTEMS FOR POST-ACCIDENT COMBUSTIBLE GAS CONTROL OF THE CONTAINMENT ATMOSPHERE SHOULD PROVIDE CONTAINMENT PENETRATION SYSTEMS FOR EXTERNAL RECOMBINER OR PURGE SYSTEMS THAT ARE DEDICATED TO THAT SERVICE ONLY, THAT MEET THE REDUNDANCY AND SINGLE-FAILURE REQUIREMENTS OF GENERAL DESIGN CRITERIA 54 AND 56 OF APPENDIX A TO 10 CFR 50, AND THAT ARE SIZED TO SATISFY THE FLOW REQUIREMENTS OF THE RECOMBINER OR PURGE SYSTEM.	IN COMPLIANCE. TWO PORTABLE HYDROGEN RECOMBINERS WILL BE ONSITE AND AVAILABLE FOR CONNECTION TO THE AFFECTED UNIT. EITHER RECOMBINER IS CAPABLE OF REDUCING HYDROGEN LEVELS AS NOTED IN FSAR SECTION 6.2.5. THE TWO SYSTEMS ARE COMPLETELY INDEPENDENT AND MEET SINGLE FAILURE CRITERIA. EACH SYSTEM HAS DEDICATED CONTAINMENT PENETRATIONS, EXTERNAL HYDROGEN MONITORS, AND CONNECTION POINTS FOR AN EXTERNAL HYDROGEN RECOMBINER. AN ADDITIONAL HYDROGEN REDUCTION CAPABILITY IS PROVIDED BY A NON-SAFETY GRADE CHARCOAL FILTERED PURGE EXHAUST UNIT.